

## REMARKS

By this amendment, claims 1 and 4 are revised and claims 2 and 5-7 are canceled to place this application in condition for allowance. Currently, claims 1, 3, and 4 are before the Examiner for consideration on their merits.

In review, the limitations of claim 2 have been incorporated into claims 1 and 4. In addition, the step of ascertaining the copper content of the molten slag has been added to each of these claims and the discharge of molten slag is now tied to the ascertainment step. No new matter is introduced by the addition of the ascertaining step since this language is supported by the original disclosure, see page 9, lines 14-16.

Turning now to the prior art rejection, claims 1, 2, and 4 stand rejected under 35 U.S.C. § 103(a) based on the combination of United States Patent No. 5,252,305 to Ezawa et al. (Ezawa) and JP 2000-248322 to Yamada. Claim 3 is also rejected under 35 U.S.C. § 103(a) based on the combination of Ezawa and Yamada when further modified according to the teachings of United States Patent No. 5,735,933 to Yokoyama et al. (Yokoyama).

Applicants submit that the prior art cited by the Examiner does not establish a *prima facie* case of obviousness against any of claims 1, 3, and 4. The traverse of the rejections is outlined below under the headings of the invention and the rejections.

### INVENTION

The invention is directed to improving the recovery of platinum group metals or PGM. The invention accomplishes this in two ways. A first way is through a control of the average grain diameter of the copper source material. This control results in elevating the

recovery ratio of the PGM and this is shown in the specification when referring to Example 1 and Comparative Examples 2 and 3. Page 12, line 10 to page 13, line 6 provides an explanation for this phenomena and this is backed up by the showing in Example 1 that a copper oxide meeting the claim limitation regarding grain size has better recovery than the copper oxide used in Comparative Examples 2, which is either less than 1 mm or greater than 10 mm.

A second aspect of the invention is the discharge of the molten slag based on copper content. The invention reveals a distinct relationship between the copper content and the PGM content of the molten slag and this can be seen when studying Figure 2. In accordance with this figure, the claimed method adopts such means that the copper content of the molten slag in the furnace is ascertained by sampling and analyzing. Then, the discharge of the molten slag from the furnace is controlled by determination of the copper content. That is, then the copper content of the molten slag is 3.0 wt.% or less, the slag is discharged. Discharging the slag based on these conditions means that PGMs are recovered at a high recovery rate. This is shown when comparing Example 1 and Comparative Example 1. Example 1 shows a much improved recovery rate when the slag is discharged according to the invention. In Comparative Example 1, the copper content was outside the claimed upper limit and recovery was not as good as when the discharge was performed according to the claimed copper content limit.

#### EZAWA AND YAMADA

##### Claim 1

In the rejection, the Examiner admits that neither Ezawa nor Yamada teaches the control of discharge of the molten slag based on copper content or the control of the grain size of the copper oxide source material. In response to the deficiencies, the Examiner contends that the grain diameter is a result effective variable and asserts that Applicants have merely optimized this known variable and such an optimization does not rise to the level of patentability.

Similarly, the Examiner contends that the relationship between copper content and the slag discharge is a result effective variable and optimizing it to the claimed limit of 3.0 wt.% or less is not a patentable advance.

First, Applicants contest the assertion that the average grain diameter of the copper source material is a recognized result effective variable in Ezawa. The Examiner tries to bootstrap this conclusion by comparing the recovery differences between Example 1 and Comparative Example 1 of Ezawa as though the difference was related to the presence of copper pieces. The flaw in this approach is that Comparative Example 1 uses an entirely different method for recovery of the PGM than Example 1 so the difference is not one of just the use of copper pieces. Example 1 use oxygen rich air to form the copper oxide, which is then removed to leave a metal copper of higher concentration of PGMs. In the Comparative Example, no oxygen rich air is used at all; and it is the processing differences between these two examples that is the reason for the difference in recovery rate.

In fact, there is no mention whatsoever of the criticality of the average grain diameter of the copper source material in Ezawa and the assertion that the Applicants are merely optimizing a known variable is without a factual basis. Ezawa makes no mention whatsoever of the size of the copper as a control variable in the process of recovering

PGMs and it defies reason to assert that Ezawa teaches that control of the average grain diameter of the copper oxide is known. Therefore, the rejection of claim 1 is improper since neither Ezawa nor Yamada recognize the critical nature of the average grain diameter of the copper source material.

Moreover, the Applicants have shown that the control of the average grain diameter does produces unexpected results and this showing would rebut any further contention of obviousness.

A second flaw in the rejection is the assertion that the control of the slag discharge based on copper content is a known variable that Applicants have merely optimized. Here, the Examiner attempts to rely on Yamada to say that the copper content of the slag is recognized as a factor in discharging the molten slag. This reasoning is also flawed since Yamada says nothing about linking the discharge of the molten slag to a copper content. First, Yamada is cited on page 1 of the application so that Applicants are fully aware of its teaching. Notably, Yamada is only cited for the general method of melting PGM and copper together and then recovering the PGM through the formation of metal and oxides. There is no mention in the specification of the recognition of the control of slag discharge based on copper content. In fact, the position being set forth by the Examiner is that, even though Applicants have gone through the trouble of preparing and filing an application in the face of Yamada, Yamada discloses the essence of the invention.

Second, the fact that Yamada may disclose a copper content and a platinum content in Tables 1 and 2 does not support the conclusion that “copper content in the molten slag is a result effective variable in terms of platinum recovery rate” as asserted in

the rejection. Applicants do not dispute that the levels of copper and platinum are disclosed in Tables 1 and 2 of Yamada. However, this disclosure does not support the allegation that it is known to control the discharge of the molten slag based on copper content. Applicants are not claiming merely identifying the copper and platinum content in the process. The claim says much more in terms of process control based on ascertaining the copper content and discharging based on a certain ascertained level. The Examiner has pointed to no factual basis to support the allegation that this type of control is already recognized so that all the artisan has to do is optimize the control so as to arrive at the claimed 3.0 wt% limit. In fact, no factual basis of this type exists in the cited art. Therefore, the rejection of the claim step regarding discharging of the slag based on an ascertained copper content of 3.0 wt.% or less is improper and a *prima facie* case of obviousness is not established using the teachings of Yamada.

If the Examiner persists in maintaining the rejection and asserting that the control of the discharge of the molten slag based on copper content is a known result effective variable, specific factual support is requested to be identified in the next Office Action.

Regardless of the above, Applicants have demonstrated that unexpected results in terms of improved recovery rates occur through the control of the copper content and slag discharge. These results would rebut any future contention of obviousness based on Ezawa and Yamada.

Since the Examiner has not supported the allegations that the control of the discharge of the molten slag and average grain diameter of the copper source material are result effective variables, the Examiner has failed to establish a *prima facie* case of

obviousness against claim 1 and the rejection based on Ezawa and Yamada must be withdrawn.

### Claim 3

Claim 3 is patentable for two reasons. The first is that it includes the features of claim 1 and the deficiencies noted above in the rejection based on Ezawa and Yamada are not cured by the presence of Yokoyama.

Secondly, the reasoning to modify the process of Ezawa using Yokoyama is incorrect and the features of claim 3 cannot be derived from Ezawa as modified by Yokoyama. Yokoyama discloses a processing method for waste batteries, copper containing materials and the like. In Yokoyama, it is essential to volatilize some materials and then condense them in order to recover them or to remove them from the waste materials.

In the rejection, the Examiner says that it would be obvious to use the reduced pressure of Yokoyama in the method of Ezawa since Yokoyama's method is similar to Ezawa. The use of this reduced pressure would result in the method of claim 3. The problem here is that Yokoyama is not similar to the processing of Ezawa. Yokoyama uses vacuum conditions and volatilizing of materials, neither of which are used in Ezawa. Thus, there is no similarity between the processes of Yokoyama and Ezawa and no reason to modify Ezawa so as to arrive at the method of claim 3. Therefore, claim 3 is separately patentable over the applied prior art.

### Claim 4

Claim 4 includes the limitations of claim 1 in terms of the range of the average grain diameter of the copper source material and control of the discharge of the molten

slag based on copper content. Therefore, this claim is patentably distinguishable over the applied prior art for the same reasons as outlined above for claim 1.

Claim 4 is also separately patentable over the applied prior art. This claim adds an additional step to claim 1 in water cooling the molten slag discharged from the furnace so as to obtain a copper source material of the defined average grain diameter. The Examiner relies on Ezawa to allege that this step is taught. This allegation is improper since the "solidified copper oxide" mentioned on page 3, lines 58-61 of Ezawa says nothing other than cooling and isolating for reuse. In order to complete the rejection, the Examiner would have to infer that the cooling was the claimed type that would produce the claimed average grain diameter of the copper source material. The cooling of Ezawa could merely be air cooling not the claimed water cooling. The problem with the Examiner's approach is that there is no basis upon which to base an inference of water cooling. Claim 4 requires that the molten slag be water cooled from a high temperature state to obtain a particular copper oxide. This type of cooling or end result is nowhere to be found in Ezawa and this reference does not establish the obviousness of this step. The only way to continue to make the rejection is the use of hindsight, and this cannot be used for purposes of making a rejection under 35 U.S.C. § 103(a). Therefore, claim 4 is patentable on its own over the applied prior art.

#### SUMMARY

In light of the revisions to claims 1 and 4, it is submitted that the prior art relied upon by the Examiner does not establish a *prima facie* case of obviousness against any of claims 1, 3, and 4. Therefore, these claims are now in condition for allowance.

Accordingly, the Examiner is requested to examine this application in light of this Amendment and pass all pending claims onto issuance.

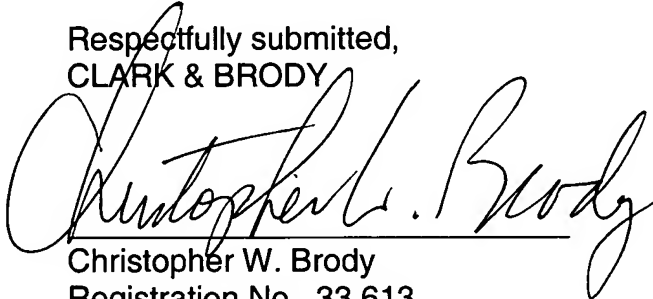
If the Examiner believes that an interview would be helpful in expediting the allowance of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

The above constitutes a complete response to all issues raised in the Office Action dated November 28, 2007.

Again, reconsideration and allowance of this application is respectfully requested.

Applicants respectfully submit that there is no fee required for this submission, however, please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,  
CLARK & BRODY

A handwritten signature in black ink, appearing to read "Christopher W. Brody", is written over a horizontal line. The signature is fluid and cursive.

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